

plication No. 09/846,410

11/30/2007

Filing date

02/13/2001

Name

Urbain A. von der Embse

Unit

2611

Examiner

Jason M. Perilla

ALLOWANCE AND FEE(S)

Attached are:

- Received cover letter with mailing date 11/23/2007
- Completed Notice of Allowance
- PTO-2038 fee payment by credit card
- Notice of Allowability

Thanks for all of your help and guidance.

Sincerely,

Name

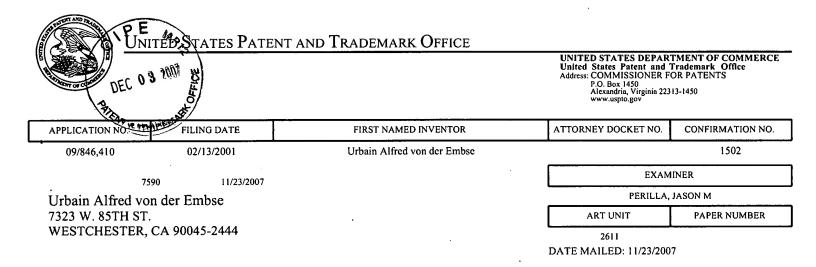
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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 751 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 751 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.



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NOTICE OF ALLOWANCE AND FEE(S) DUE

11/23/2007

Urbain Alfred von der Embse 7323 W. 85TH ST. WESTCHESTER, CA 90045-2444

EXAMINER PERILLA, JASON M

ART UNIT

PAPER NUMBER

2611

DATE MAILED: 11/23/2007

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/846,410	02/13/2001	Urbain Alfred von der Embse		1502
LE OF INVENTION: M	IULTIPLE DATA RATE COM	PLEX WALSH CODES FOR CDMA		
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APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1440	\$0	\$0	\$1440	02/25/2008

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current **SMALL ENTITY status:**

- A. If the status is the same, pay the TOTAL FEE(S) DUE shown
- B. If the status above is to be removed, check box 5b on Part B -Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

- A. Pay TOTAL FEE(S) DUE shown above, or
- B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.
- II. PART B FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.
- III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

0 0 2007	Application No.	Applicant(s)
DEC 0 3 2007 B	09/846,410	VON DER EMBSE, URBAIN
Notice of Allowability	Examiner	ALFRED Art Unit
GTRADE	Examiner .	Artonit
	Jason M. Perilla	2611
The MAILING DATE of this communication and I claims being allowable, PROSECUTION ON THE MERITS erewith (or previously mailed), a Notice of Allowance (PTOL-DTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT the Office or upon petition by the applicant. See 37 CFR 1.	IS (OR REMAINS) CLOSED in 85) or other appropriate communiting RIGHTS. This application is sugard and MPEP 1308.	this application. If not included nication will be mailed in due course. TH
. This communication is responsive to the amendment file		
. X The allowed claim(s) is/are <u>claims 5-9 renumbered res</u>	pectively as claims 1-5.	
a) All b) Some* c) None of the		r (f).
 Certified copies of the priority documents h Certified copies of the priority documents h 		n No.
Copies of the certified copies of the priority		
International Bureau (PCT Rule 17.2(a)).		2
* Certified copies not received:		
Applicant has THREE MONTHS FROM THE "MAILING DAT noted below. Failure to timely comply will result in ABANDO THIS THREE-MONTH PERIOD IS NOT EXTENDABLE. 	NMENT of this application.	•
INFORMAL PATENT APPLICATION (PTO-152) which	gives reason(s) why the oath or	declaration is deficient.
 CORRECTED DRAWINGS (as "replacement sheets") (a) including changes required by the Notice of Draftsp 		(PTO-948) attached
1) hereto or 2) to Paper No./Mail Date		
(b) ☐ including changes required by the attached Examir Paper No./Mail Date		in the Office action of
Identifying indicia such as the application number (see 37 CF each sheet. Replacement sheet(s) should be labeled as such	in the header according to 37 CFI	R 1.121(d).
 DEPOSIT OF and/or INFORMATION about the de attached Examiner's comment regarding REQUIREME 	eposit of BIOLOGICAL MATE NT FOR THE DEPOSIT OF BIO	RIAL must be submitted. Note the LOGICAL MATERIAL.
Attach mont/s)		
Attachment(s) . ⊠ Notice of References Cited (PTO-892)	5. Notice of Inf	ormal Patent Application
. Notice of Draftperson's Patent Drawing Review (PTO-94		mmary (PTO-413), Mail Date <u>20071120</u> .
☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date		Amendment/Comment
Examiner's Comment Regarding Requirement for Depos	sit 8. 🗌 Examiner's S	Statement of Reasons for Allowance
of Biological Material	9. 🗌 Other	



EXAMINER'S AMENDMENT

- 1. Claims 5-9 are pending in the instant application.
- 2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Urbain A. von der Embse on November 20, 2007.

The application has been amended as follows wherein the following versions of claims 5-9 replace all prior versions in their entirety:

- Claim **5**. A method for generating and applying <u>N</u> hybrid Walsh complex orthogonal codes for code division multiple access (CDMA), said method comprising the steps:
- generating N Walsh codes W(c) with code index c=0,1,2,...,N-1, each with N chips where N is a power of 2,
- generating said N hybrid Walsh codes $\widetilde{\mathbb{W}}$ (c) by reordering each of said N Walsh codes into a corresponding real component and a corresponding imaginary component of a hybrid Walsh code

as defined by equations

for c = 0,
$$\widetilde{\mathbb{W}}$$
 (c) = W(0) + jW(0) for c = 1,2,...,N/2-1, $\widetilde{\mathbb{W}}$ (c) = W(2c) + jW(2c-1) for c = N/2, $\widetilde{\mathbb{W}}$ (c) = W(N-1) + jW(N-1)) for c = N/2+1,...,N-1, $\widetilde{\mathbb{W}}$ (c) = W(2N-2c-1)+jW(2N-2c) wherein j= $\sqrt{-1}$,

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- wherein said \underline{N} hybrid Walsh codes are generated by reading the N Walsh codes chip values from a Walsh code memory in a digital signal processor and writing the reordered Walsh codes to a hybrid Walsh code memory,
- applying said N hybrid Walsh codes in an encoder and in a decoder of a CDMA system by encoding transmitting data and decoding receiving data with replacing existing said N Walsh real codes with said N hybrid Walsh complex codes according to a same-code vector indexing, and

transmitting data encoded by the encoder and receiving data decoded by the decoder.

- Claim 6. A method for generating and applying spreading codes for code division multiple access (CDMA), comprising the steps:
- constructing a P by P Discrete Fourier Transform (DFT) <u>code</u> matrix E <u>having row vectors</u> and <u>column elements</u> and <u>using said DFT matrix as a spreading code with code</u> matrix E wherein <u>said</u> row vectors are code vectors, and <u>said</u> column elements are code elements, <u>and P is an integer</u>,
- constructing a spreading code from a hybrid Walsh code having row vectors and column elements and a DFT code, said spreading code is defined by an N*P row by N*P column code matrix C wherein row vectors are code vectors and column elements are code chips elements,
- said hybrid Walsh code is defined by a N row by N column code matrix $\widetilde{\mathbb{W}}$ where N is a power of 2,
- constructing said \underline{a} spreading code matrix C is constructed by a Kronecker product of said hybrid Walsh code matrix $\widetilde{\mathbb{W}}$ with said DFT code matrix E defined by the equation

C = ₩SE

- wherein the operator "⊗" is a Kronecker product operation and <u>said spreading code is</u> defined by an N*P row by N*P column code matrix,
- applying said spreading code matrix C in an encoder and in a decoder of a CDMA system by encoding data and decoding data with replacing existing real Walsh code matrix W with said hybrid Walsh complex code said spreading code matrix C, and

transmitting data encoded by the encoder and receiving data decoded by the decoder.

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- Claim 7. A method for implementing hybrid Walsh codes for <u>code division multiple</u> <u>access (CDMA)</u>, comprising the steps:
- encoding N data symbols contained in a block with respective N hybrid Walsh codes to yield N encoded data symbols for each block at the output chip rate of 1/T chips per second wherein T is the interval between chips and N is s power of 2,
- wherein said encoder accepts up to N users per block wherein N is s power of 2 and M is

 the <u>an</u> actual number of users represented in the block, each of said users
 having a data rate corresponding to one of 1,2,...,N/2 data symbols per block,
- wherein said encoder accepts packets from each user and writes them to memory "A" for each block, wherein a binary address index comprising a number of bits corresponding to the maximum number of users N is used for addressing said data symbols stored in memory "A" and the data symbols for each user of the block are stored in memory "A" in a hierarchy such that a particular user is selected according to a number of more significant bits of the binary address index and the data symbols of the particular user are selected according to a number of lesser significant bits of the binary address index, the number of more significant bits and lesser significant bits of the particular user being determined according to the data rate of the particular user and the total number of users M per block.
- Claim 8. Wherein said encoder hybrid Walsh codes in claim 5 have implements a fast encoding implementation algorithm, comprising the steps:
- wherein said fast encoding algorithm implemented in the <u>said</u> encoder uses memory "A" for input and to support pass 1 and uses memories "B", <u>and</u> "C" to support passes 2,..., M wherein N=2^M <u>and M is an integer</u> and uses memory "D" to store the encoded chip output from the <u>a</u> reordering pass,
- writing input data symbol vector $Z(d_0, d_1, \ldots, d_{M-2}, d_{M-1})$ to said <u>memory</u> "A" wherein the <u>at</u> binary addressing word <u>values</u> takes address values $d_0d_1 = 0, 1, 2, \ldots$ $\frac{1}{1}, N-1, d_0, d_1, \ldots, d_{M-2}, d_{M-1}$

wherein

on pass m=1, reads reading pairs of data symbols from "A" and performs performing a two-point hybrid Walsh transform on the two data symbols in each pair specified

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- by the \underline{a} binary data addresses $d_{M-1}=0,1$ and writes writing the output to "B" at \underline{a} reordered d_{M-1} binary data address, the same addresses re-labeled with the binary chip addresses $n_0=0,1$.
- on pass m-2 m=2, reads reading pairs of data symbols from "B" and performs performing a two-point hybrid Walsh transform on the two data symbols in each pair specified by the <u>a</u> binary data addresses d_{M-2}=0,1 and writes writing the output to "C" at <u>a reordered d_{M-2} binary data address</u>, the same addresses re-labeled with the binary chip addresses n₁=0,1,
- on pass m=3, continues this processing by reading pairs of data symbols from "C" and performing a two-point hybrid Walsh transform on two data symbols in each pair with the specified by a binary addresses d_{M-3}=0,1 and writing the 2-point hybrid Walsh transform output to "B" at a reordered d_{M-3} binary data address, the same addresses re-labeled with the binary chip addresses n₂=0,1,
- continuing passes m=4,...,M-1, M continue this processing using memories "B" and "C" and data binary addresses d_{M-4} through d₀,
- pass m=M completes the calculation of the fast hybrid Walsh transform by performing a two-point hybrid Walsh transform pass m=M on the two data symbols specified by the binary data addresses d₀=0,1 and writing the output to the other memory at the same addresses re-labeled with the binary chip addresses n_{M-1}=0,1,
- write writing the output of pass m=M is the in an encoded chip vector $Z(n_{M-1}, \dots, n_0)$ stored in bit-reversed order,
- performing wherein a final reordering pass to reorders reorder the encoded chip vector \underline{Z} and stores the ordered store the reordered output chip vector $Z(n_0, n_4, \dots, n_{M-2}, n_{M-1})$ in memory "D", and
- wherein said encoder in said CDMA transmitter reads said encoded chip vector \underline{Z} in said "D" and overlays said encoded chip vector with long and short pseudo-noise (PN) codes to generate N chips of said encoded chip vector for transmission.
- Claim 9. Wherein said <u>decoder</u> hybrid Walsh codes in claim 5 have <u>implements</u> a fast decoding implementation algorithm, comprising the steps:
- wherein said fast decoding algorithm implemented in said decoder uses memory "A" for input and to support pass 1 and uses memories "B" and "C" to support passes 2,.

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...,M wherein N=2^M and M is an integer and uses memory "D" to store the decoded chip output from a reordering pass,

removing wherein the decoder strips off said pseudo-noise (PN) codes from the <u>a</u> received N chip encoded chip vector and writes writing the resultant encoded chip vector Z(n₀, n₄,...,n_{M-2}, n_{M-1}) to <u>said</u> memory "A" wherein the <u>at</u> binary addressing word <u>values</u> takes address values n₀n₁•••••n_{M-2}n_{M-1}=0,1,2,...,N-1, n₀, n₁...,n_{M-2}, n_{M-1}

wherein

- on pass m=1, reads reading pairs of chip symbols from "A" and performs performing a two-point hybrid Walsh inverse transform on the two chip symbols in each pair specified by the a binary chip addresses n₀=0,1 and writes writing the output to "B" at a reordered n₀ binary data address the same addresses re-labeled with the binary data addresses d_{M-1}=0,1,
- on pass m-2 m=2, reads reading pairs of chip symbols from "B" and performs performing a two-point hybrid Walsh inverse transform on the two chip symbols in each pair specified by the \underline{a} binary chip addresses n_1 =0,1 and writes writing the output to "C" at a reordered \underline{n}_1 binary data address the same addresses re-labeled with the binary data addresses \underline{d}_{M-2} =0,1,
- on pass m=3 continues this processing by reading pairs of chip symbols from "C" and performing a two-point hybrid Walsh inverse transform on two chip symbols in each pair with the specified by a binary addresses n₂=0,1 and writing the 2-point hybrid Walsh inverse transform output to "B" at a reordered n₂ binary data address the same addresses re-labeled with the binary chip addresses d_{M-3}=0,1,
- continuing passes m=4, ..., M-1, M continue this processing using memories "B" and "C" and data binary addresses n_3 through n_M ,
- pass m=M completes the calculation of the fast hybrid Walsh inverse transform by performing a two-point hybrid Walsh inverse transform on the two-data symbols specified by the binary chip—addresses $n_{M-1}=0,1$ and writing the output to the other memory—at the same addresses re-labeled with the binary chip addresses $d_0=0,1,$
- writing the write output of pass m=M is the data in a decoded data symbol vector Z(d_{M-1}, ...,d₀) stored in bit-reversed order,

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performing wherein a final scaling pass that scales the decoded data symbol vector Z by the a N-chip hybrid Walsh inverse transform scaling factor "1/2N", and reorders the scaled data symbol vector, and stores the reordered data symbol vector as output vector Z(d₀, d₁,...,d_{M-2}, d_{M-1}) in memory "D", and

wherein said decoder in said CDMA receiver reads said decoded data symbol output vector in said "D" for further processing to recover information from the data symbols.

Claims 5-9 are renumbered respectively as claims 1-5, and the claim dependency is renumbered accordingly.

Allowable Subject Matter

3. Claims 5-9 renumbered respectively as claims 1-5 are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Perilla whose telephone number is (571) 272-3055. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh M. Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jason M. Perilla November 20, 2007

jmp 4.

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER

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த்தி இது இது Exampler-Initiated Interview Summary	09/846,410	VON DER EMBSE, URBAIN ALFRED
DW FRADE	Examiner	Art Unit
	Jason M. Perilla	2611
All Participants:	Status of Application: P	<u>ending</u>
(1) <u>Jason M. Perilla</u> .	(3)	
(2) <u>Urbain A von der Embse</u> .	(4)	
Date of Interview: 20 November 2007	Time: <u>10am</u>	
Type of Interview: ☐ Telephonic ☐ Video Conference ☐ Personal (Copy given to: ☐ Applicant ☐ Applicant ☐ Exhibit Shown or Demonstrated: ☐ Yes ☐ No If Yes, provide a brief description:	cant's representative)	
Part I.		
Rejection(s) discussed:		
Claims discussed: 5-9 Prior art documents discussed:		,
Part II.		
SUBSTANCE OF INTERVIEW DESCRIBING THE GENI Applicant reviewed and approved a proposed Examiner's Ameri		
Part III.		
 ☑ It is not necessary for applicant to provide a separate directly resulted in the allowance of the application. To of the interview in the Notice of Allowability. ☑ It is not necessary for applicant to provide a separate did not result in resolution of all issues. A brief summand 	he examiner will provide a wri	itten summary of the substance ne interview, since the interview
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Notice of References Cited	09/846,410	Reexamination VON DER EMBSE, URBAIN AL	
Notice of References Cited	Examiner	Art Unit	
TRADE	Jason M. Perilla	2611	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	Α	US-5,311,176	05-1994	Gurney, David P.	341/50
*	В	US-6,389,138	05-2002	Li et al.	380/35
*	С	US-6,674,712	01-2004	Yang et al.	370/208
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).) Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.